

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

ACTIVE WIRELESS TECHNOLOGIES
LLC,

Plaintiff,

V.

VERIZON COMMUNICATIONS, INC.
and CELLCO PARTNERSHIP D/B/A
VERIZON WIRELESS,

Defendants,

ERICSSON INC.,

Intervenor.

[Decorative flourish]

Case No. 2:23-cv-00620-JRG

JURY TRIAL DEMANDED

**ACTIVE WIRELESS TECHNOLOGIES LLC'S
OPENING CLAIM CONSTRUCTION BRIEF**

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I. INTRODUCTION

Pursuant to P.R. 4-5(a) and the Court’s First Amended Docket Control Order of December 16, 2024 (Dkt. 47), Plaintiff Active Wireless Technologies LLC (“AWT”) hereby submits its Opening Claim Construction Brief. The asserted patents are U.S. Patent Nos. 10,531,443 (the “’443 Patent,” Ex. A), 11,019,557 (the “’557 Patent,” Ex. B), and 10,601,566 (the “’566 Patent,” Ex. C) (together, the “Asserted Patents”). This brief is supported by the expert Declaration of Mr. Regis (Bud) Bates. Ex. D, Declaration of Mr. Regis (Bud) Bates Regarding Claim Construction.

II. CLAIM CONSTRUCTION STANDARD OF REVIEW

The governing legal standards relating to claim construction are described in the Court’s opinion in *AGIS Software Dev., LLC v. Huawei Device USA Inc.*, No. 2:17-cv-513-JRG, 2018 WL 4908169, at *3-*5 (E.D. Tex. Oct. 10, 2018) and are hereby incorporated by reference. *See also Seoul Semiconductor Co. v. Nichia Corp.*, 596 F. Supp. 2d 1005 (E.D. Tex. 2009).

III. LEVEL OF ORDINARY SKILL IN THE ART

For this case, the relevant time period for interpreting the claims of the Asserted Patents is June 15, 2017 for the ’443 Patent, the date being the filing date of its provisional application No. 62/520,520; April 5, 2018 for the ’557 Patent, which is when Atsushi Ishii, the inventor of the ’557 Patent, on behalf of Sharp Corporation, disclosed the invention in R2-1805565 entitled “Considerations on System Information Area ID,” which is a Tdoc for 3GPP RAN2 Meeting 101-Bis; and August 10, 2017 for the ’566 Patent, the filing date of its provisional application No. 62/543,795. Ex. D, ¶ 49.

Plaintiff proposes that the person of ordinary skill in the art (“POSITA”) would have (1) a Bachelor of Science degree or equivalent degree in electrical engineering or computer science / engineering or software technologies and (2) at least two years of industry experience in wireless

cellular communications, internet protocols, and/or communications networking technology. Ex. D, ¶ 48. A person could also have qualified as a POSITA with some combination of (1) more formal education (such as Master of Science degrees) and less technical experience, or (2) less formal education and more technical or professional experience in the fields listed above. *Id.*

Plaintiff's expert, Mr. Regis (Bud) Bates is considered to be a POSITA at the time of the invention(s), and Mr. Bates has submitted an expert declaration regarding certain claim constructions from the viewpoint of a person of ordinary skill in the art. *See generally* Ex. D.

IV. DISPUTED CLAIM TERMS

A. '443 Patent

1. Term 1: "code block groups (CBGs)" (Claims 3 and 5 '443 Patent)

AWT's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning.	Plain and ordinary meaning in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard

Both parties ostensibly agree that this term should be afforded its plain and ordinary meaning since the meaning of this phrase is clear from the context of the claims of the '443 Patent and its specification, and the specification and prosecution history contain no lexicography or disavowal of claim scope.

Defendants' additions of "in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard" to the "plain and ordinary meaning" are improper and contradictory. First, Defendants' addition that the "[p]lain and ordinary meaning [is] *in the context of the patent specification*" is redundant (emphasis added). Courts give claim terms their *ordinary and accustomed meaning* as understood by one of ordinary skill in the art at the time of the invention *in the context of the entire patent*. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-

13; *accord Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003). “[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but ***in the context of the entire patent, including the specification.***” *Phillips*, 415 F.3d at 1313 (emphasis added). If, as both parties contend, that the plain and ordinary meaning applies for this term, Defendants’ addition of “in the context of the patent specification” is unnecessary and should be rejected. Separately, Defendants’ expert declaration includes no references to the specification of the ’443 Patent outside of its general section on “’443 Background,” “Alleged novelty per PH,” and “Focus of Claims.” *See generally* Defendants’ Expert Declaration of Thomas Fuja, Ph.D. in Support of Claim Construction (Ex. E), ¶¶ 23-40. It is unclear what “context of the patent specification” or any portions of the patent specification that Defendants are referring to in construing the term “code block groups (CBGs).”

Second, there is no dispute that the “3GPP specifications articulating 5G wireless standard” are not incorporated by reference into the ’443 Patent and are therefore considered extrinsic evidence. Defendants concede this point by marking the 3GPP Standards as “Extrinsic Evidence” in the Parties’ Joint Claim Construction and Prehearing Statement. *See* Dkt. 48-1, at 2-7. Only if a claim term remains ambiguous after an examination of intrinsic evidence, the court may resort to extrinsic evidence. *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1332 (Fed. Cir. 2001). Defendants’ expert does not make any assertion that a POSITA would find the “claim term ambiguous after an examination of intrinsic evidence.” Instead, Defendants describe one specific implementation and, particularly, the associated information elements for that implementation, such as [PDSCH-]CodeBlockGroupTransmission, maxCodeBlockGroupsPerTransportBlock, CBGTI, and CBGFI into the construction of “code block groups,” even though one specific implementation of “code block groups” has no bearing

on what the term actually means or should be construed as. *See* Ex. E, ¶¶ 55-82; Ex. D, ¶ 53.

Defendants’ expert’s entire rationale for why particular implementations and specific parameters should be incorporated into the plain and ordinary meaning of the “code block groups” term is that “the entire concept of CBG’s cannot work unless both sides of the transmission understand exactly the specific correspondence between the transmitted portions (e.g., code blocks) and the bits (e.g., assignment to code block groups)” and that “[i]f those parameters are not configured, CBGs are not used, and cannot be used because those parameters are used in the formula to define how to allocate code blocks to particular code block groups.” Ex. E, ¶¶ 65, 70. The particulars of how code block groups are implemented or made possible in the context of the “3GPP specifications articulating 5G wireless standards” is plainly irrelevant and outside the scope of Claims 3 and 5. To the extent that such an implementation is an embodiment (it is not even incorporated into the ’443 Patent specification), it is improper to limit the construction of a term to particular embodiments in a patent, let alone “embodiments” *not* in the patent, as is the case here. *Pacing Techs., LLC v. Garmin Int’l, Inc.*, 778 F.3d 1021, 1026 (Fed. Cir. 2015) (“[when] the patent describes multiple embodiments, every claim does not need to cover every embodiment. This is particularly true [when] the plain language of a limitation of the claim does not appear to cover that embodiment.”) (internal citations omitted).

Defendants’ interpretation of a “code block group” as necessarily implementing certain aspects of the “3GPP specifications articulating 5G wireless standard” also directly contradicts the specification of the ’443 Patent, which explicitly notes that the scope of the present disclosure is “not limited to certain 3GPP standards” or “Releases”:

At least some aspects of the systems and methods disclosed herein may be described in relation to the 3GPP LTE, LTE-Advanced (LTE-A) and other standards (e.g., 3GPP Releases 8, 9, 10, 11 and/or 12). However, *the scope of the present disclosure should not*

be limited in this regard. At least some aspects of the systems and methods disclosed herein *may be utilized in other types of wireless communication systems.*

Ex. D, ¶ 53 (citing '443 Patent, 3:36-43 (emphasis added)).

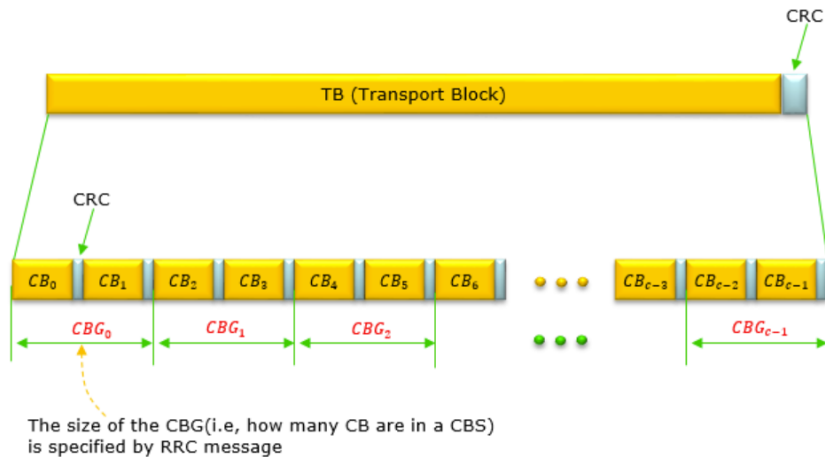
[T]he scope of the disclosure *should not be limited to 3GPP standards.*

Id. (citing '443 Patent, 3:67-4:1 (emphasis added)). Because “[e]xtrinsic evidence may not be used ‘to contradict claim meaning that is unambiguous in light of the intrinsic evidence,’” Defendants’ addition of “3GPP specifications articulating 5G wireless standard” that contradict the '443 Patent specification must be rejected. *Summit 6, LLC v. Samsung Elecs. Co.*, 802 F.3d 1283, 1290 (Fed. Cir. 2015) (quoting *Phillips*, 415 F.3d at 1324).

Third, Defendants do not dispute the meaning of the terms “transport block” or “code block” in Claim 3 and 5’s recitation of “code block groups (CBGs) of a transport block.” Both Plaintiff’s and Defendants’ experts agree that a POSITA would understand that a transport block is a block of data to be transported (i.e., transmitted) and transport blocks can be further segmented into code blocks, named as such because each of these segmented **blocks** of data can be *individually [de]coded*. Ex. D, ¶ 52 (citing Ex. F, AWT-VERIZON0006038 (“In 5G NR, data is transmitted in units called Transport Blocks. These blocks can be quite large.”; “To manage these large blocks more effectively, Transport Blocks are divided into smaller units called Code Blocks.”); Ex. G, AWT-VERIZON0005988 (“As in LTE, in NR as well a huge TB (Transport Block) is split into multiple CBs (Code Block)”); Ex. E, ¶ 49 (“The transport block could be broken up into smaller ‘code blocks’ (CBs).”), ¶ 54 (“portions of the data transmission (e.g., what code blocks)”), ¶ 48 (citing R1-1705066 at 1) (“the transport block (TB) is the basic transmission unit for physical layer. After padding CRC, a TB is segmented to several code blocks (CB) according to the maximum CB size limitation (e.g., 6144 bits for LTE). Then 24-bit CRC sequence is attached

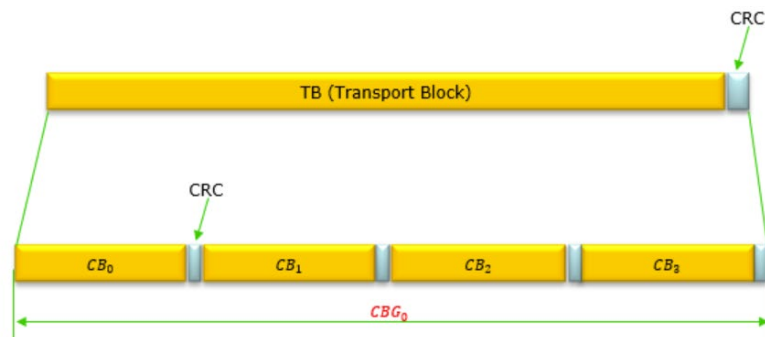
to each CB so that each code block can be decoded independently.”). The segmentation of the transport blocks into code blocks allows for more efficient error correction and decoding by dividing the transmission load of the bigger transport block into manageable chunks. Ex. D, ¶ 52 (citing Ex. F, AWT-VERIZON0006038 (“This segmentation helps in better error detection and correction.”); Ex. H, AWT-VERIZON0006045-48; Ex. I, AWT-VERIZON0006049-57).

Given the apparent agreement that “code block” has a plain and ordinary meaning that would be understandable by a POSITA without any reference to “3GPP specifications articulating 5G wireless standard,” any claim construction dispute is limited to whether the addition of “group” to the term “code block” radically changes the meaning of the term. That is not the case since a POSITA would understand that the plain and ordinary meaning of a code block group is simply a group (i.e., a collection of one or more) of code blocks. Ex. D, ¶ 54 (citing Ex. F, AWT-VERIZON0006038 (“A Code Block Group (CBG) is a collection of one or more Code Blocks.”); Ex. J, AWT-VERIZON0006041 (“A group must contain at least one element.”)). The graphics described below support this understanding because they describe three examples of how code blocks may be grouped in a transport block: (i) one group of one code block corresponding to the entire transport block; (ii) multiple groups corresponding to each individual code block that make up the transport block; or (iii) multiple groups of multiple code blocks that make up a transport block:

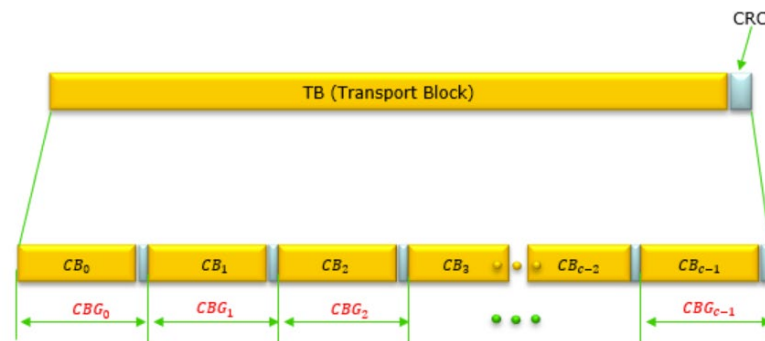


Typical structure of TB is illustrated as above. One TB is usually made up of multiple CBG and one CBG is usually made up of multiple CB. But there is possibility of seeing some extreme types as shown below.

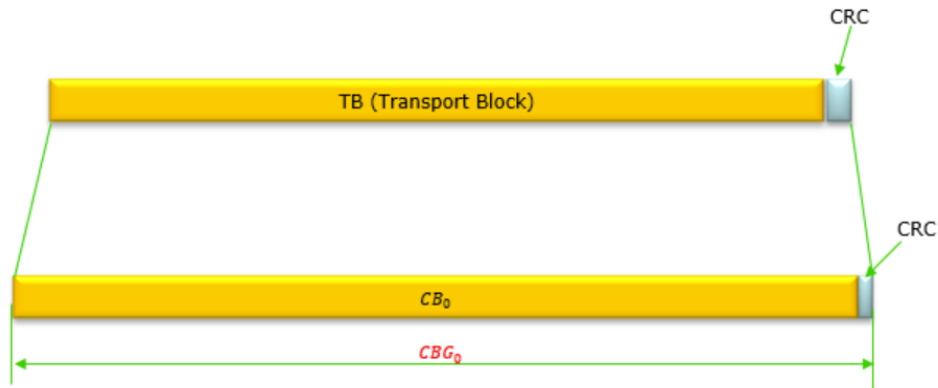
In the example shown below, one TB is made up of only one CBG which is made up of multiple CBs.



In following example, you see one TB which is made up of multiple CBG and one CBG is made up of only one CB.



In rare case, you may see a TB made up of CBG as follows. In this case, one TB is made up of one CBG and the CBG is made up of only one CB.



Ex. D, ¶ 55 (citing Ex. K, AWT-VERIZON0006018-6019). There is nothing in Defendants’ expert declaration that precludes any of the aforementioned three examples not being within the scope of the plain and ordinary meaning of “code block groups (CBGs).” *See generally* Ex. E, ¶¶ 41-82.

For the reasons above, Defendants fail to advance any legitimate basis to (i) exclude either a single code block group comprising all code blocks or multiple code block groups, each corresponding to a single code block from the claimed term; (ii) incorporate a multitude of specific information elements / parameters from one specific 3GPP 5G NR implementation into the construction of the claim term; (iii) describe how the intrinsic record narrows the claim term to one particular implementation of the 3GPP standard; or (iv) overcome the explicit contradictions between the ’443 Patent specification and the 3GPP standards. Therefore, a POSITA would have understood “code block groups (CBGs)” to be construed under its plain and ordinary meaning without the vague and improperly limiting restriction of “in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard” that Defendants seek to add.

2. Term 2: “CBG based HARQ-ACK” (Claims 3 and 5, ’443 Patent”)

AWT’s Proposed Construction	Defendants’/Intervenors’ Proposed Construction
Plain and ordinary meaning	Plain and ordinary meaning in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard

Both parties ostensibly agree that this term should be afforded its plain and ordinary meaning since the meaning of this phrase is clear from the context of the claims of the ’443 Patent and its specification, and the specification and prosecution history contain no lexicography or disavowal of claim scope.

Defendants’ additions of “in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard” to the “plain and ordinary meaning” are improper and contradictory. First, Defendants’ addition that the “[p]lain and ordinary meaning [is] *in the context of the patent specification*” is redundant (emphasis added). Courts give claim terms their *ordinary and accustomed meaning* as understood by one of ordinary skill in the art at the time of the invention *in the context of the entire patent*. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13; *accord Alloc, Inc.*, 342 F.3d at 1368. “[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but *in the context of the entire patent, including the specification.*” *Phillips*, 415 F.3d at 1313 (emphasis added). If, as both parties contend, that the plain and ordinary meaning applies for this term, Defendants’ addition of “in the context of the patent specification” is unnecessary and should be rejected. Separately, Defendants’ expert declaration includes no references to the specification of the ’443 Patent outside of its general section on “’443 Background,” “Alleged novelty per PH,” and “Focus of Claims.” *See generally* Ex. E, ¶¶ 23-40. It is unclear what “context of the patent specification” or any portions of the patent specification that Defendants are referring

to in construing the term “CBG based HARQ-ACK.”

Second, there is no dispute that the “3GPP specifications articulating 5G wireless standard” are not incorporated by reference into the ’443 Patent and are therefore considered extrinsic evidence. Defendants concede this point by marking the 3GPP Standards as “Extrinsic Evidence” in the parties’ Joint Claim Construction and Prehearing Statement. *See* Dkt. 48-1, at 2-7. Only if a claim term remains ambiguous after an examination of intrinsic evidence, the court may resort to extrinsic evidence. *Interactive Gift Express*, 256 F.3d at 1332. Defendants’ expert does not make any assertion that a POSITA would find the “claim term ambiguous after an examination of intrinsic evidence.” Instead, Defendants describe one specific implementation and, particularly, the associated information elements for that implementation, such as [*PD SCH-CodeBlockGroupTransmission, maxCodeBlockGroupsPerTransportBlock, CBGTI, and CBGFI*] into the construction of “CBG-based HARQ-ACK,” even though one specific implementation of “CBG-based HARQ-ACK” has no bearing on what the term actually means or should be construed as. *See* Ex. E, ¶¶ 55-82; Ex. D, ¶ 60.

Defendants’ expert’s entire rationale for why particular implementations and specific parameters should be incorporated into the plain and ordinary meaning of “CBG based HARQ-ACK” term is that “the entire concept of CBG’s cannot work unless both sides of the transmission understand exactly the specific correspondence between the transmitted portions (e.g., code blocks) and the bits (e.g., assignment to code block groups)” and that “[a]bsent both sides of the transmission knowing this specific information, the entire HARQ-ACK process cannot function because the base station and the UE would not have sufficient information such that both sides would understand the which transmission bits (e.g., which code blocks) failed to properly be received by the UE.” Ex. E, ¶¶ 65, 70. The particulars of how “CBG based HARQ-ACK” is

implemented or made possible in the context of the “3GPP specifications articulating 5G wireless standards” is plainly irrelevant and outside the scope of Claims 3 and 5. To the extent that such an implementation is an embodiment (it is not even incorporated into the ’443 Patent specification), it is improper to limit the construction of a term to particular embodiments in a patent, let alone “embodiments” *not* in the patent, as is the case here. *Pacing Techs., LLC*, 778 F.3d at 1026 (“[when] the patent describes multiple embodiments, every claim does not need to cover every embodiment. This is particularly true [when] the plain language of a limitation of the claim does not appear to cover that embodiment.”) (internal citations omitted).

Defendants’ interpretation of a “CBG based HARQ-ACK” as necessarily implementing certain aspects of the “3GPP specifications articulating 5G wireless standard” directly contradicts the specification of the ’443 Patent, which explicitly notes that the scope of the present disclosure is “not limited to certain 3GPP standards” or “Releases”:

At least some aspects of the systems and methods disclosed herein may be described in relation to the 3GPP LTE, LTE-Advanced (LTE-A) and other standards (e.g., 3GPP Releases 8, 9, 10, 11 and/or 12). However, ***the scope of the present disclosure should not be limited in this regard. At least some aspects of the systems and methods disclosed herein may be utilized in other types of wireless communication systems.***

Ex. D, ¶ 60 (citing ’443 Patent, 3:36-43 (emphasis added)).

[T]he scope of the disclosure ***should not be limited to 3GPP standards.***

Id. (citing ’443 Patent, 3:67-4:1 (emphasis added)). Because “[e]xtrinsic evidence may not be used ‘to contradict claim meaning that is unambiguous in light of the intrinsic evidence,’” Defendants’ addition of “3GPP specifications articulating 5G wireless standard” that contradict the ’443 Patent specification must be rejected. *Summit 6, LLC*, 802 F.3d at 1290 (quoting *Phillips*, 415 F.3d at 1324).

Third, the plain and ordinary meaning of the term “CBG based HARQ-ACK” is ascertainable from Claim 3 and 5 themselves and supported by the specification of the ’443 Patent.

Specifically, Claims 3 and 5 recite a bifurcated definition of CBG based HARQ-ACK:

receiv[e]/[ing] CBG based HARQ-ACK, wherein

for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), [the receiving circuitry is configured to receive] one HARQ-ACK bit for the transport block,

for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), [the receiving circuitry is configured to receive] HARQ-ACK bits of all CBGs.

Ex. D, ¶ 58 (citing ’443 Patent, Claims 3, 5). If the PDSCH is scheduled in a CSS, CBG based HARQ-ACK is “one HARQ-ACK bit for the transport block” and if the PDSCH is scheduled in a USS, CBG based HARQ-ACK is “HARQ-ACK bits of all CBGs.” *Id.* A POSITA reading the claim would have understood “wherein” to imply the definition of the received CBG based HARQ-ACK follows and is conditioned upon the search space in which the PDSCH is scheduled in. *Id.*

The claim language itself is supported in the ’443 Patent specification, which matches the claim language described above and further indicates that the claimed CBG-based HARQ-ACK is defined by the claim language itself and dependent on the search space in which the PDSCH is scheduled in:

For CBG-based HARQ-ACK, if a PDSCH is scheduled in a common search space (CSS), the UE may report one bit per TB on a PUCCH with small payload; if a PDSCH is scheduled in a UE-specific search space (USS), the UE may report HARQ-ACK bits of all CBGs on a PUCCH with a large payload.

Id., ¶ 59 (citing ’443 Patent, 5:20-39 (emphasis added)). Given the unambiguity in the claim language itself and the supporting specification, that is where the inquiry of the plain and ordinary

meaning should end.

Defendants’ expert does not even analyze the words of the claim, despite the Federal Circuit’s continued guidance that the process of construing a claim term begins with the words of the claims. *Phillips*, 415 F.3d at 1312–14; *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996); *DSW, Inc. v. Shoe Pavilion, Inc.*, 537 F.3d 1342, 1347 (Fed. Cir. 2008) (citing *N. Telecom Ltd. v. Samsung Elecs. Co.*, 215 F.3d 1281, 1295 (Fed. Cir. 2000)) (“[A]bsent contravening evidence from the specification or prosecution history, plain and unambiguous claim language controls the construction analysis.”); *Tempo Lighting, Inc. v. Tivoli, LLC*, 742 F.3d 973, 977 (Fed. Cir. 2014) (stating in claim construction, the court “gives primacy to the language of the claims, followed by the specification”); *see generally* Ex. E, ¶¶ 55-82.

For the reasons above, Defendants fail to advance any legitimate basis to (i) ignore the claim language itself in understanding the claimed “CBG based HARQ-ACK”; (ii) incorporate a multitude of specific information elements / parameters from one specific 3GPP 5G NR implementation into the construction of the claim term; (iii) describe how the intrinsic record narrows the claim term to one particular implementation of the 3GPP standard; or (iv) overcome the explicit contradictions between the ’443 Patent specification and the 3GPP standards. Therefore, a POSITA would have understood “CBG based HARQ-ACK” to be construed under its plain and ordinary meaning without the vague and improperly limiting restriction of “in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard” that Defendants seek to add.

B. '566 Patent

1. Term 3: “the frequency hopping” (Claims 8 and 16, '566 Patent”)

AWT’s Proposed Construction	Defendants’/Intervenors’ Proposed Construction
“[] frequency hopping”	Indefinite under § 112(b) for lacking antecedent basis

This Court has already construed this exact term for the '566 Patent consistent with the analysis below and Defendants have not provided any expert declaration on this term that either conflicts with or would alter Mr. Bates’ analysis of what a POSITA would have understood in the context of the claim language and the specification. *See Active Wireless Techs., LLC v. T-Mobile et al.*, Case No. 2:23-cv-00261-JRG, Dkt. 89, at 16-20 (Oct. 15, 2024); Ex. D, ¶ 69.

While Defendants contend that the recitation of “*the* frequency hopping” renders this claim term indefinite for lack of antecedent basis, a POSITA would understand the scope of this term with reasonable certainty without the need for further construction. The use of “the” does not render this claim indefinite because if “[t]he scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite.” *Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1359 (Fed. Cir. 2001); *see also Energizer Holdings, Inc. v. Int’l Trade Comm’n*, 435 F.3d 1366, 1371 (Fed. Cir. 2006) (“A claim that is amenable to construction is not invalid on the ground of indefiniteness.”).

Here, antecedent basis is met because a POSITA would have readily understood that Claim 8 recites frequency hopping applied to multiple slot PUCCH, regardless of whether “the” precedes “frequency hopping” in the claim. Ex. D, ¶ 63. A POSITA would have reached that understanding because the “receiv[ing] uplink control information (UCI) with the frequency hopping for the configured multiple slots PUCCH” of Claim 8 directly corresponds to the UE’s transmission of

UCI with frequency hopping of Claim 1. *Id.*, ¶ 64. Therefore, read in view of Claim 1, a POSITA would understand how the claimed base station and a UE work together to exchange information, including the recited “frequency hopping.” *Id.* Claim 1 of the ’566 Patent is an apparatus claim that recites:

1. A user equipment (UE), comprising:

a processor; and

memory in electronic communication with the processor, wherein instructions stored in the memory are executable to:

determine an uplink control channel (PUCCH) spans over multiple slots based on a signaling from a base station (gNB);

determine a method of a frequency hopping for the configured multiple slots PUCCH; and

transmit uplink control information (UCI) with the frequency hopping, wherein

the number of symbols of the PUCCH is the same in each slot of the multi slots, and

the location of the symbols for the PUCCH is the same in the each slot of the multiple slots.

Id. (citing ’566 Patent, Claim 1).

Claim 8’s base station “transmit[s], to a user equipment (UE), a signaling, an uplink control channel (PUCCH) spans over multiple slots being determined based on the signaling.” *Id.*, ¶ 65 (citing ’566 Patent, Claim 8). The signaling provided by the base station to the UE is used to configure or “determine an uplink control channel (PUCCH) spans over multiple slots based on [that] signaling from a base station (gNB).” *Id.* (citing ’566 Patent, Claim 1). Based on the signaling, the UE further “determine[s] the method of frequency hopping for the configured multiple slots PUCCH” and “transmit[s] uplink control information (UCI) with the [determined]

frequency hopping” to be received by the base station. *Id.* Therefore, when the base station “receive[s] uplink control information (UCI)” from the UE over the multiple slot PUCCH configured by the base station’s signaling, it arrives “with the frequency hopping” already determined. *Id.* (citing ’566 Patent, Claim 8). Because the frequency hopping method has been determined by the UE and implemented in the multiple slot PUCCH transmitted to the base station, a POSITA would understand that both the frequency hopping method and implementation are incorporated into Claim 8’s recited “frequency hopping for the configured multiple slots PUCCH.” *Id.*

The entire specification, in addition to Claim 1 above, is replete with references to frequency hopping, and specifically to frequency hopping related to uplink control information (UCI) spanning over multiple slots. *Id.*, ¶ 66. For example, while frequency hopping may or may not be supported generally depending on DMRS (demodulation reference signal) patterns, the specification makes clear that the ’566 Patent claims those embodiments which do support frequency hopping, because “[f]requency hopping is a key feature for PUCCH to provide frequency diversity”:

Frequency hopping is a key feature for PUCCH to provide frequency diversity. If configured, the PUCCH symbols can be transmitted at different PUCCH regions. For a long PUCCH duration in a slot, only 1 hop is supported. Whether frequency hopping can be supported or not may be determined by the DMRS patterns, and vice versa.

Id. (citing ’566 Patent, 17:5-10).

For further example, as described below, a POSITA would clearly understand that frequency hopping of the received UCI spanning multiple slots (PUCCH) is inherent in view of the base station’s ability to receive UCI from a UE with a frequency hopping (as noted above), as well as the base station’s ability to execute instructions stored in memory in order to “determine a

frequency hopping method of the configured multi-slot PUCCH”:

A base station (gNB) is also described. The gNB includes a processor and memory in electronic communication with the processor. ***Instructions stored in the memory are executable to*** determine an uplink control channel (PUCCH) spans over multiple slots. The instructions are also executable to determine a demodulation reference signals (DMRS) structure in the configured multi-slot PUCCH. The instructions are further executable to ***determine a frequency hopping method of the configured multi-slot PUCCH***. The instructions are additionally executable to determine UCI encoding and loading methods on the configured multi-slot PUCCH. The instructions are also executable to determine a resource of a control channel for UCI feedback. The instructions are further executable to receive UCI on a selected channel.

Id., ¶ 67 (citing ’566 Patent, 3:38-51). Because frequency hopping is an inherent feature of configured multiple slots PUCCH, as claimed and in view of Claim 1 and the ’566 Patent specification, a POSITA would not understand the presence of “the frequency hopping” to imply antecedent basis is required earlier in Claim 8. *Id.* Simply removing “the” solidifies what a POSITA would have already understood from reading the claim language. *Id.*

Claim 16 is the corresponding method claim to Claim 8 and, therefore, the same reasons above as to why a POSITA would understand “the frequency hopping” to be construed as “[] frequency hopping” apply to Claim 16. *Id.*, ¶ 68.

Therefore, this term should be construed as “[] frequency hopping” in view of a POSITA’s ability to reasonably ascertain the meaning of the claim term in view of the claims and ’566 Patent specification.

2. Term 4: “the configured multiple slots PUCCH” (Claims 8 and 16, ’566 Patent)”

AWT’s Proposed Construction	Defendants’/Intervenors’ Proposed Construction
“the ‘PUCCH span[ning] over multiple slots [] determined based on the signaling”	Indefinite under § 112(b) for lacking antecedent basis

Defendants contend that this term should be construed as indefinite for lacking antecedent basis, while Plaintiff contends that this term should be construed as: “the PUCCH span[ning] over multiple slots [] determined based on the signaling.” Presumably, Defendants argue there is lack of antecedent basis based on the word “configured” in “the configured multiple slots PUCCH” but the word choice would not prevent a POSITA from finding the scope of the claim reasonably ascertainable. *Bose Corp.*, 274 F.3d at 1359 “[t]he scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite.”). Therefore, Defendants’ proposed construction must be rejected.

As a preliminary matter, at least Ericsson Inc., the Intervenor in this case, previously agreed to Plaintiff’s currently proposed construction in *Active Wireless Techs., LLC v. T-Mobile et al.*, Case No. 2:23-cv-00261-JRG, Dkt. 89, at 6 (Oct. 15, 2024), and in so doing, agreed that a POSITA would find the term reasonably ascertainable. Ex. D, ¶ 71. Defendants have not provided any expert declaration on this term that either conflicts with or would alter Mr. Bates’ analysis of what a POSITA would have understood in the context of the claim language and the specification.

First, Claims 8 and 16 both recite “transmit, to a user equipment (UE), a signaling, an uplink control channel (PUCCH) spans over multiple slots being determined based on the signaling.” *Id.*, ¶ 72. The “uplink control channel (PUCCH) span[ning] over multiple slots [] determined based on the signaling” is the *only* other PUCCH recited earlier than “the configured multiple slots PUCCH.” *Id.* Therefore, a POSITA would be aware that the “configured multiple

slot PUCCH” must be referring to the earlier instance of the recited PUCCH that was determined based on the signaling transmitted by the base station to the UE. *Id.*

Second, in context with Claim 1, the UE apparatus analogue to Claim 8’s base station apparatus, a POSITA would have readily understood why the PUCCH in this term is considered “configured.” *Id.*, ¶ 73. Claim 1 of the ’566 Patent is an apparatus claim that recites:

1. A user equipment (UE), comprising:

a processor; and

memory in electronic communication with the processor, wherein instructions stored in the memory are executable to:

determine an uplink control channel (PUCCH) spans over multiple slots based on a signaling from a base station (gNB);

determine a method of a frequency hopping for the configured multiple slots PUCCH; and

transmit uplink control information (UCI) with the frequency hopping, wherein

the number of symbols of the PUCCH is the same in each slot of the multi slots, and

the location of the symbols for the PUCCH is the same in the each slot of the multiple slots.

Id. (citing ’566 Patent, Claim 1).

As described above with respect to “the frequency hopping” term, the signaling provided by the base station to the UE is used to configure or “determine an uplink control channel (PUCCH) spans over multiple slots based on [that] signaling from a base station (gNB).” *Id.*, ¶ 74 (citing ’566 Patent, Claim 1). Based on the signaling, the UE further “determine[s] the method of frequency hopping for the configured multiple slots PUCCH” and “transmit[s] uplink control information (UCI) with the [determined] frequency hopping.” *Id.* Therefore, when the base station

“receive[s] uplink control information (UCI)” from the UE, it arrives “with the frequency hopping” and other format aspects of the PUCCH already determined for the multiple slot PUCCH configured by the base station’s signaling. *Id.* (citing ’566 Patent, Claim 8).

Third, the ’566 Patent specification confirms that the base station configures various aspects of “the PUCCH format of a UE,” which include the “length restrictions in each slot, RS patterns in each slot, frequency hopping methods and UCI coding methods for a long PUCCH over multiple slots”:

In NR, the long PUCCH format may span over multiple slots, and the PUCCH format of a UE may be configured by a base station. The systems and methods described herein detail formats for long PUCCH design over multiple slots. In particular, length restrictions in each slot, RS patterns in each slot, frequency hopping methods and UCI coding methods for a long PUCCH over multiple slots are described.

Id., ¶ 75 (citing ’566 Patent, 5:48-55). All the aforementioned aspects of the configuration of the multiple slot PUCCH occur through transmission of the recited signaling from the base station to the UE so that the UE knows how to transmit UCI over the configured PUCCH. *Id.* A POSITA would therefore understand that the recited “the configured multiple slots PUCCH” must derive its antecedent basis from the previously recited “uplink control channel (PUCCH) span[ning] over multiple slots [] determined based on the signaling.” *Id.*

Fourth, Defendants’ expert admits that a POSITA would readily ascertain that the “gNB will ‘configure’ the UE to know how to transmit uplink control information on the PUCCH.” Ex. E, ¶¶ 85 (citing ’566 Patent, 26:19-37), 83 (citing ’566 Patent, 5:40-55) (“the PUCCH is used to transmit uplink control information (“UCI”) from user equipment (UE) to base stations. The 5G base station (or gNB) configures the PUCCH format that is used by the UE for transmitting the UCI to the base station.”), 86 (“the PUCCH includes UCI with ‘frequency hopping’ for the

configured multiple slots PUCCH”). “[T]he ‘PUCCH span[ning] over multiple slots [] determined based on the signaling” recited earlier in Claim 8 is the same PUCCH that Defendants’ expert concedes “includes UCI with ‘frequency hopping’ for the configured multiple slots PUCCH.” Frequency hopping is merely part of the “know how” that Defendants’ expert refers to when the “gNB will ‘configure’ the UE to know how to transmit uplink control information on the PUCCH” via the recited “signaling.”

Therefore, this term should be construed as “the uplink control channel (PUCCH) span[ning] over multiple slots [] determined based on the signaling” in view of a POSITA’s understanding of that clear antecedent basis.

3. Term 5: “slots” / “slot” (Claims 8-14 and 16, ’566 Patent”)

AWT’s Proposed Construction	Defendants’/Intervenors’ Proposed Construction
Plain and ordinary meaning	Plain and ordinary meaning in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard

Both parties ostensibly agree that this term should be afforded its plain and ordinary meaning since the meaning of this phrase is clear from the context of the claims of the ’566 Patent and its specification, particularly because the specification and prosecution history contain no lexicography or disavowal of claim scope.

Defendants’ additions of “in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard” to the “plain and ordinary meaning” are improper and contradictory. First, Defendants’ addition that the “[p]lain and ordinary meaning [is] *in the context of the patent specification*” is redundant (emphasis added). Courts give claim terms their *ordinary and accustomed meaning* as understood by one of ordinary skill in the art at the time of the invention *in the context of the entire patent*. *Phillips*, 415 F.3d at 1312-13; *accord*

Alloc, Inc., 342 F.3d at 1368. “[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but ***in the context of the entire patent, including the specification.***” *Phillips*, 415 F.3d at 1313 (emphasis added). If, as both parties contend, that the plain and ordinary meaning applies for this term, Defendants’ addition of “in the context of the patent specification” is unnecessary and should be rejected.

Second, there is no dispute that the “3GPP specifications articulating 5G wireless standard” are not incorporated by reference into the ’566 Patent and are therefore considered extrinsic evidence. Defendants concede this point by marking the 3GPP Standards as “Extrinsic Evidence” in the parties’ Joint Claim Construction and Prehearing Statement. *See* Dkt. 48-1, at 2-7. Only if a claim term remains ambiguous after an examination of intrinsic evidence, the court may resort to extrinsic evidence. *Interactive Gift Express*, 256 F.3d at 1332. Defendants’ expert does not make any assertion that a POSITA would find the “claim term ambiguous after an examination of intrinsic evidence.” Instead, Defendants’ expert alleges that a “slot” must necessarily be 12 or 14 OFDM symbols in length based on 3GPP TS 38.211 V15.2.0 (Ex. E, ¶¶ 94-95), one of the “3GPP specifications articulating 5G wireless standard.” However, such a statement directly contradicts the specification of the ’566 Patent, which notes embodiments where slots may be configured to have durations of 6, 7, 10, or 12 symbols:

In NR, a slot may be configured as 7 symbols or 10 symbols. Therefore, for normal CP, if a slot includes 7 symbols, a long PUCCH in a slot may have durations from 4 to 7 symbols. If a slot includes 14 symbols, a long PUCCH in a slot may have durations from 4 to 14 symbols. Similarly, for extended CP, if a slot includes 6 symbols, a long PUCCH in a slot may have durations from 4 to 6 symbols. If a slot includes 12 symbols, a long PUCCH in a slot may have durations from 4 to 12 symbols.

Ex. C, 11:26-35. On this basis alone, Defendants’ attempt to narrow the claim from the “3GPP

specifications articulating 5G wireless standard” to only 12 or 14 symbols must be rejected as interpreting the claim term in a way that excludes embodiments disclosed in the specification. *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1305 (Fed. Cir. 2007) (rejecting proposed claim interpretation that would exclude disclosed examples in the specification); *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1369 (Fed. Cir. 2003) (finding district court’s claim construction erroneously excluded an embodiment described in an example in the specification, where the prosecution history showed no such disavowal of claim scope).

Similarly, Defendants seek to exclude embodiments related to sub-slots as a type of slot. Defendants’ entire argument that mini-slots are not types of slots is only based on the fact that they are less than 12 or 14 OFDM symbols. *See* Ex. E, ¶ 98 (“‘mini-slots’ cannot be interpreted as ‘slots’ because, by definition, they are shorter than slots.”; “Because a sub-slot cannot contain as many OFDM symbols as a slot, the two terms cannot be used interchangeably.”; opining that because the smaller duration of mini-slots “enable[s] low-latency scheduling of data,” mini-slots cannot be a type of slot). As shown in the ’566 Patent disclosure above, slots may be configured as less than 12 or 14 OFDM symbols, which undermines Defendants’ argument that mini-slots are not types of slots merely on the basis of a length differential.

The ’566 Patent also explicitly notes that the scope of the present disclosure is “not limited to certain 3GPP standards” or “Releases”:

At least some aspects of the systems and methods disclosed herein may be described in relation to the 3GPP LTE, LTE-Advanced (LTE-A) and other standards (e.g., 3GPP Releases 8, 9, 10, 11 and/or 12). However, the scope of the present disclosure should not be limited in this regard. At least some aspects of the systems and methods disclosed herein may be utilized in other types of wireless communication systems.

Ex. D, ¶ 80 (citing '566 Patent, 4:23-30).

[T]he scope of the disclosure should not be limited to 3GPP standards.

Id. (citing '566 Patent, 4:44-46 (emphasis added)).

Because “[e]xtrinsic evidence may not be used ‘to contradict claim meaning that is unambiguous in light of the intrinsic evidence,’” Defendants’ addition of “3GPP specifications articulating 5G wireless standard” that contradicts the '566 Patent specification by both excluding embodiments, as well as narrowing scope of the disclosure in a way that the '566 Patent specifically warns against, must be rejected. *Summit 6, LLC*, 802 F.3d at 1290 (quoting *Phillips*, 415 F.3d at 1324).

Both Plaintiff’s and Defendants’ experts agree that the plain and ordinary understanding that a “slot” is a “temporal allocation” or “time unit within a subframe” that “last[s] for a specified amount of time, depending on the numerology deployed.” Ex. E, ¶ 99; Ex. D, ¶ 78(citing Ex. L, AWT-VERIZON0006034). While a slot “**typically** consists of 14 Orthogonal Frequency-Division Multiplexing (OFDM) symbols,” (Ex. D, ¶ 78 (citing Ex. L, AWT-VERIZON0006034)), as noted above, the specification of the '566 Patent describes that a slot may have various durations ranging from 6, 7, 10, 12, or 14 symbols:

In NR, a slot may be configured as 7 symbols or 10 symbols. Therefore, for normal CP, if a slot includes 7 symbols, a long PUCCH in a slot may have durations from 4 to 7 symbols. If a slot includes 14 symbols, a long PUCCH in a slot may have durations from 4 to 14 symbols. Similarly, for extended CP, if a slot includes 6 symbols, a long PUCCH in a slot may have durations from 4 to 6 symbols. If a slot includes 12 symbols, a long PUCCH in a slot may have durations from 4 to 12 symbols.

Id. (citing '566 Patent, 11:26-35). The '566 Patent also discloses that slots may have various durations in terms of time. For example, FIG. 5 of the '566 Patent shows that a 1ms subframe can

be divided into various lengths of slots depending on numerology that is configured from the base station:

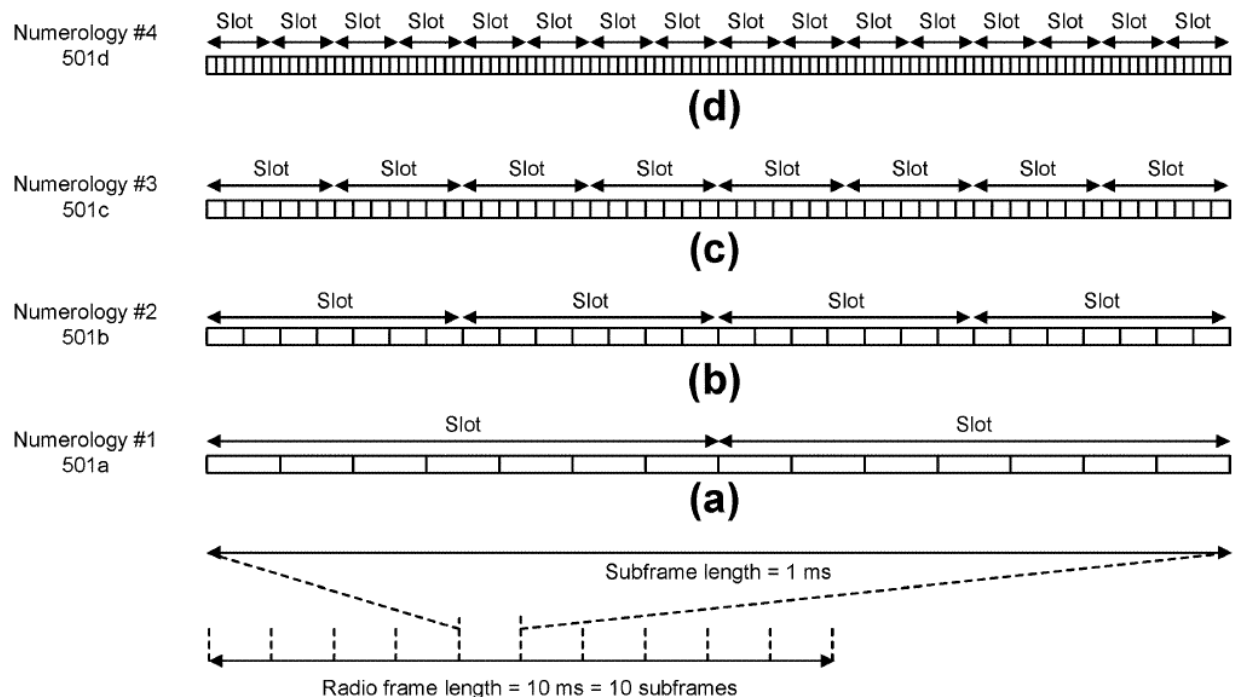


FIG. 5

Id. (citing '566 Patent, FIG. 5).

The '566 Patent also discloses different types of slots, such as a sub-slot (also known as a mini-slot), which is used in the same manner as a conventional slot, that is a “scheduling unit,” except that a sub-slot is designed to be of a smaller duration and “may include one or more OFDM symbols”:

FIG. 6 shows examples of slots 683 and sub-slots 607. If a sub-slot 607 is not configured by higher layer, the UE 102 and the eNB/gNB 160 may only use *a slot 683 as a scheduling unit*. More specifically, a given transport block may be allocated to a slot 683. If the sub-slot 607 is configured by higher layer, the UE 102 and the eNB/gNB 160 may use the sub-slot 607 as well as the slot 683. *The sub-slot 607 may include one or more OFDM symbols.*

...

In cases when the sub-slot 607 is configured, a given transport block may be allocated to either a slot 683, a sub-slot 607, aggregated sub-slots 607 or aggregated sub-slot(s) 607 and slot 683. This unit may

also be a unit for HARQ-ACK bit generation.

Id., ¶ 79 (citing '566 Patent, 31:15-46) (emphasis added).

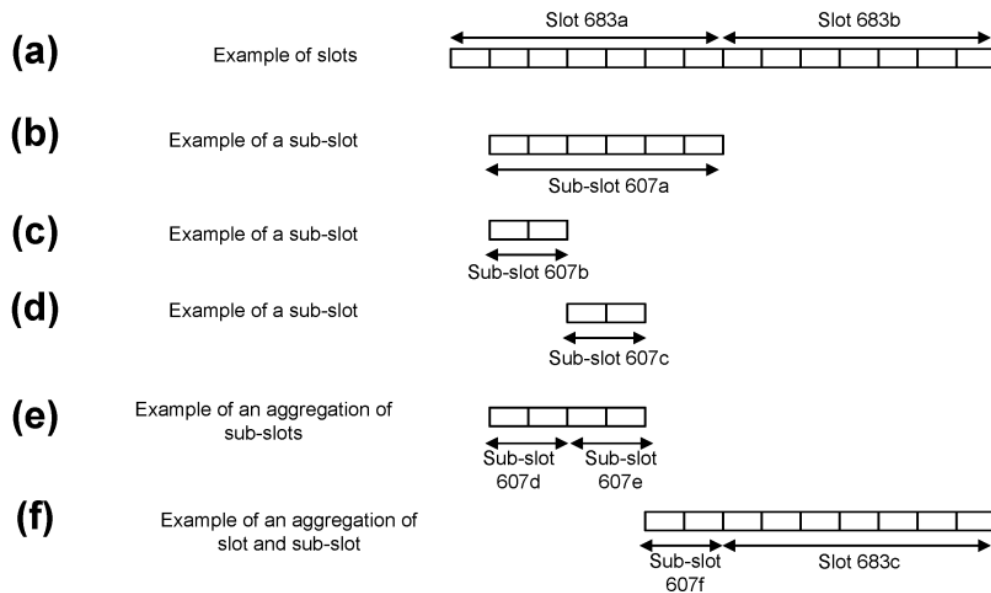


FIG. 6

Id. (citing '566 Patent, FIG. 6) (disclosing various types and lengths of “slots” and aggregations of “slots and “sub-slots”). A POSITA would have readily understood that the disclosure in the '566 Patent supports the plain and ordinary meaning of “slot” as encompassing various types of scheduling units, including sub-slots or mini-slots disclosed therein. *Id.* In other words, a POSITA would interpret mini-slots as one type of shorter duration slot for applications that require faster response times. *Id.* (citing Ex. M, AWT-VERIZON0005999-6000 (“Mini-slots allow the 5G frame structure to provide faster response times for certain applications.”); Ex. N, AWT-VERIZON0005985-86 (“Think of a regular slot as a standard delivery truck. Mini-slots, on the other hand, are essentially smaller, faster vehicles designed for urgent deliveries. They achieve this by leveraging a shorter duration compared to regular slots.”))).

For the reasons above, Defendants fail to advance any legitimate basis to (i) exclude slots with durations of OFDM symbols other than 12 or 14 from the claimed term; (ii) describe how the

intrinsic record narrows the claim term to one particular implementation of the 3GPP standard; or (iii) overcome the explicit contradictions between the '566 Patent specification and the 3GPP standards. Therefore, a POSITA would have understood “slot[s]” to be construed under its plain and ordinary meaning without the vague and improperly limiting restriction of “in the context of the patent specification and the 3GPP specifications articulating 5G wireless standard” that Defendants seek to add.

V. CONCLUSION

For all the foregoing reasons, AWT respectfully requests that the Court adopt AWT's proposed constructions.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system per Local Rule CV-5(a)(3) on January 17, 2025.

/s/ Vincent J. Rubino, III

Vincent J. Rubino, III